

REMARKS

This is in response to the Office Action dated April 28, 2004. In view of the foregoing amendments and following representations, reconsideration is respectfully requested.

Initially, on page 2 of the Office Action, claim 14 is objected to based on a minor informality. Note that the Examiner's suggestion has been adopted, and thus the objection is now clearly obviated.

Next, on pages 2-3 of the Office Action, claims 9-12 and 14-17 are provisionally rejected under the judicially created doctrine of obviousness-type double patenting. Accordingly, upon receiving an indication of allowable subject matter, a Terminal Disclaimer will be submitted in order to overcome the provisional double patenting rejection.

Next, on pages 3-11 of the Office Action, the original claims are rejected as follows:

Claims 9-18 are rejected under 35 U.S.C. § 103(a) as being unpatentable over Dantzig et al. (USPN 4,523,624) in view of Naess, Jr. et al. (EP 0 337 769);

Claims 9, 11, 14 and 16 are rejected under 35 U.S.C. § 103(a) as being unpatentable over Dantzig in view of Sokolowski (USPN 4,501,317);

Claims 9-18 are rejected under 35 U.S.C. § 103(a) as being unpatentable over Nagai et al. (USPN 5,205,344) in view of Naess, Jr. et al.;

Claims 9, 11, 14 and 16 are rejected under 35 U.S.C. § 103(a) as being unpatentable over Nagai et al. in view of Sokolowski; and

Claims 9-18 are rejected under 35 U.S.C. § 103(a) as being unpatentable over Kittilsen et al. (USPN 5,915,455).

The present invention is directed to horizontal casting equipment in which gas and oil can be supplied to a horizontal metal mold in a controlled manner in a primary cooling section of the mold. In the present invention, the cooling effect of the primary

cooling section can be varied depending upon the length of a protrusion of the insulating plate (19).

In particular, the mold required in independent claim 9 requires, *inter alia*:

a primary cooling section including a circumferential wall formed of permeable wall material, provided along an interior wall of said mold housing, so as to define a wall of the mold cavity, wherein oil and/or gas can be supplied through said permeable wall material to the mold cavity;

a secondary cooling section including at least one annular slit arranged along a circumference of the cavity for directly supplying coolant into the cavity so as to provide secondary cooling of the metal being cast; and

an insulating plate provided with through holes communicating said reservoir with the mold cavity, said insulating plate having a protrusion extending along the wall of the cavity in an axial direction of the mold, and the length of the protrusion is selected based on the required primary cooling effect.

Note that independent claim 14 requires an insulating plate provided with through holes communicating said reservoir with the mold cavity, wherein said insulating plate is provided with a protrusion that extends along said permeable wall material in an axial direction of the mold such that a cooling effect is affected by the length of the protrusion.

Danzig discloses a process and apparatus for controlling the position of a cast ingot so that distortions of the metal casting are avoided. In the Danzig system, oil is supplied as a lubricant and water is supplied as a coolant. The water is supplied as a uniform curtain on the molten metal. Clearly, Danzig does not disclose an arrangement having primary and secondary cooling zones.

The Examiner acknowledges that Danzig lacks several features of claim 9, and applies **Naess, Jr.** to teach an insulating plate the includes “an inwardly protruding projection 15 extending along the surface of the permeable wall material”. The Naess

plate and projection do not correspond to the insulating plate and projection recited in claims 9 and 14. In Naess, a sleeve 12 is provided with an inwardly protruding projection 15, and the end 16 of the projection forms a lower side wall of the mold cavity. A permeable ring 20 is provided between the projection 15 and the hot-top 10. Clearly, even if the references could be combined as proposed by the Examiner, the sleeve 12 of the Naess reference does not meet the limitations in claims 9 and 14 requiring an insulating plate provided with through holes communicating said reservoir with the mold cavity, wherein said insulating plate is provided with a protrusion that extends along said permeable wall material such that a cooling effect is affected by the length of the protrusion.

Similarly, **Sokolowski** does not disclose or suggest an insulating plate having a projection extending along the permeable wall material to determine the primary cooling effect.

Nagai discloses a horizontal casting device having an orifice plate 2 formed with a plurality of orifices 4. As shown in Fig. 4, the orifice plate is formed on its front surface with a recess, and a starting pin 12 is located in the recess. The Examiner relies on the Naess reference to teach the projection extending along the permeable wall material. However, as noted above, the projection recited in claims 9 and 14 is part of the insulating plate and extends along the permeable wall material in an axial direction of the mold to affect the primary cooling depending upon the length of the projection. Clearly the projection taught by Naess does not meet the limitations of claims 9 and 14, and is not a factor in determining the primary cooling effect.

Kittilsen discloses a horizontal casting apparatus having primary and secondary cooling water circuits (11, 12). However, the cooling circuits of Kittilsen do not correspond to the primary and secondary cooling sections required in claim 9 or the primary and secondary cooling effects required in claim 14. Furthermore, the insulating plate 29 of Kittilsen does not include the claimed projection extending along said permeable wall material in an axial direction of the mold such that a cooling effect is

affected by the length of the protrusion. In Kittilsen, heating elements 27 are provided along the inlet to prevent the steel pipe 28 from extracting heat from the molten metal. Clearly, the Kittilsen reference does not meet the limitations of claims 9 and 14 as presently amended.

In view of the above, it is submitted that the present application is now clearly in condition for allowance. The Examiner therefore is requested to pass this case to issue.

In the event that the Examiner has any comments or suggestions of a nature necessary to place this case in condition for allowance, then the Examiner is requested to contact Applicant's undersigned attorney by telephone to promptly resolve any remaining matters.

Respectfully submitted,

Inge JOHANSEN et al.

By: *Michael Huppert*
Michael S. Huppert
Registration No. 40,268
Attorney for Applicants

MSH/kjf
Washington, D.C. 20006-1021
Telephone (202) 721-8200
Facsimile (202) 721-8250
September 28, 2004